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Attorney Docket No. 15258-176-1US

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05/20/98

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BOX PATENT APPLICATION
Washington, D.C. 20231

"Express Mail" Label No. EL008721882US
Date of Deposit: May 20, 1998

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Assistant Commissioner for Patents
Washington, D.C. 20231

By: Tracy Cima

Sir:

Transmitted herewith for filing is the
[**X**] continuation patent application of

Inventor(s)/Applicant Identifier: Andreas Walder

For: METHOD FOR THE PRODUCTION OF EXPANDABLE PLASTICS GRANULATE

[X] This application claims priority from each of the following Application Nos./filing dates:
U.S. Patent Application No. 08/373,304/Filed January 25, 1995
the disclosure(s) of which is (are) incorporated by reference.

Enclosed are:
[X] 2 sheet(s) of [**X**] formal [ ] informal drawing(s).
[X] A [X] signed [ ] unsigned Declaration & Power of Attorney
[X] A Preliminary Amendment is enclosed

Claims Pending Upon Entry Of The Enclosed Preliminary Amendment

	(Col. 1)		(Col. 2)
FOR:	NO. FILED		NO. EXTRA
BASIC FEE			
TOTAL CLAIMS	14	- 20 =	*0
INDEP. CLAIMS	1	- 3 =	*0
[ ] MULTIPLE DEPENDENT CLAIM PRESENTED			

SMALL ENTITY			OTHER THAN SMALL ENTITY	
RATE	FEE	OR	RATE	FEE
	$395.00	OR		$790.00
x $11.00 =		OR	x $22.00 =	$0.00
x $41.00 =		OR	x $82.00 =	$0.00
+ $135.00 =		OR	+ $270.00 =	
TOTAL		OR	TOTAL	$790.00

* If the difference in Col. 1 is less than 0, enter "0" in Col. 2.

Please charge Deposit Account No. 20-1430 as follows:
[**X**] Filing fee $ $790.00
[**X**] Any additional fees associated with this paper or during the pendency of this application.
[ ] The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b)

[ ] A check for $_____ is enclosed.
2 extra copies of this sheet are enclosed.

Respectfully submitted,
TOWNSEND and TOWNSEND and CREW LLP

Kevin T. LeMond
Reg No.: 35,933
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154807

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Date of Deposit 5/20/98

PATENT
Attorney Docket No.: 15258-176-1

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Assistant Commissioner for Patents
Washington, D.C. 20231

By: Tracy Cruico

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

ANDREAS WALDER

Application No.: Not Yet Assigned

Filed: May 20, 1998

For: METHOD FOR THE PRODUCTION OF EXPANDABLE PLASTICS GRANULATE

Examiner: J. Leyson

Art Unit: 1305

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-referenced application, please enter the following amendments and remarks.

IN THE SPECIFICATION:

Page 1, after the title add the following sentence --This application is a continuation of and claims the benefit of U.S. Patent Application No. 08/373,304 filed January 25, 1995.

Page 1, immediately above the first line of the specification, commencing "The invention relates" insert (centered):

--BACKGROUND OF THE INVENTION--;

on the next line after BACKGROUND OF THE INVENTION, insert:

--1. Field of the Invention--;

between lines 5 and 6, insert:

--2. Description of the Prior Art--;

line 8, change "moulded" to --molded--;

line 27, after "19" insert a comma;

between lines 28 and 29, insert (centered):

--SUMMARY OF THE INVENTION--:

Page 2, line 6, delete "This aim is achieved by";

lines 7-11, reading "the method .... (claim 15)", delete entirely;

line 19, after "discovery" delete the comma;

line 23, after "invention" insert a comma.

Page 3, lines 2-6, reading "The dependent .... impregnated mixture", delete entirely;

line 7, delete "and a useful method of granulation.", and delete "feature of";

line 8, delete "claim 5, namely";

line 11, change "is used" to --preferably--, and delete "preferably";

line 13, after "hydrocarbons" insert --, is used--, and delete "may be used";

line 16, after "cells)" insert --may be used--;

lines 17-21, reading "The dependent ... the invention.", delete entirely;

between lines 21 and 22, insert (centered):

--BRIEF DESCRIPTION OF THE DRAWINGS--;

lines 22 and 23, reading "The invention .... the drawings:", delete entirely;

line 26, change "shows qualitatively represented" to --is a graph illustrating the--;

last line, change "shows" to --is a graph illustrating--.

Page 4, line 1, change "equipment" to --embodiment--;

line 2, change "for", first occurrence, to --illustrating--;

between lines 3 and 4, insert (centered):

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--;

line 5, delete "the", first occurrence, after "steps" insert a colon, and delete "referred to in the";

line 6, delete "preamble of claim 1:"

line 7, change "To these" to --These--;

line 8, change "Figures" to --Figs.--, and after "3" insert --to--;

line 12, delete "are";

line 13, after "3" delete the comma, and after "4" insert --are--.

Page 5, line 2, delete "the", first occurrence;

line 6, change "Because the" to --The--;

line 7, after "temperature" insert --means--, and after "and" insert --therefore--;

line 8, delete "proceeds", and after "agent" insert --proceeds--;

line 10, change "°C" to --degrees Celsius--;

last line, after "shearing" insert --being--.

Page 6, line 6, please delete "A" and substitute therefor --A'--;

line 14, please change "10" to --10'--;

line 16, change "materia" to --material--;

line 18, please change "B" to --B'--;

line 19, please change "A'" to --A"--;

line 20, please change "21" to --21'--;

line 21, please change "1, 2" to --1', 2'--;

line 24, please change "1" to --1'--;

line 24, delete "a", second occurrence;

line 26, please change "2" to --2'--;

line 26, delete "a";

line 29, please change "1 and 2" to --1' and 2'--;

line 29, delete "e";

line 30, delete "is performed", and after "dispersion" insert --is performed--;

line 30, please change "1" to --1'--.

Page 7, line 2, please change "2" to --2'--;

line 7, please change "3" to --3'--;

line 10, after "namely" delete the colon;

line 11, after "pipes." please add --Such a device is illustrated in Fig. 4.--;

line 13, delete "may be used, for instance";

line 14, change "in" to --may be used--;

line 17, after "is" delete the comma;

line 18, please change "4" to --4'--;

line 19, please delete "(not shown)";

line 20, please change "C" to --C'--;

line 22, delete "is used", and after "°C)" insert --is used--;

line 30, change "As a" to --A--;

line 31, change "also" to --and--;

line 32, after "granulator" insert --may also be used--.

Page 8, line 1, delete "may be made", and after "granulate" insert --may be made--.

IN THE ABSTRACT:

Attached hereto on a separate page is a new Abstract of the Disclosure. It is requested that it be substituted for the originally filed Abstract.

IN THE DRAWINGS:

Attached is a proposed Amended Figure 4.

IN THE CLAIMS:

Please delete claims 1-15.

Please add the following new claims 16-29.

16. (New) A method for the production of expandable plastics granulate from a plastics melt and a fluid blowing agent that is, when at an elevated pressure within a predetermined pressure, range only partly soluble in the melt, the method comprising the steps of:

dispersing the blowing agent in the melt with extensive shearing of the melt thereby creating a mixture;

retaining the mixture within a predetermined pressure range for a predetermined retention time;

subjecting the mixture to substantially little shearing during the predetermined retention time;

cooling the mixture to a temperature that is several degrees Celsius above the solidification temperature of the melt ;

granulating the cooled mixture; and

acting on the mixture with static mixer elements.

17. (New) The method of claim 16 wherein the cooling is performed at least partly by components that also act on the mixture for static mixing.

18. (New) The method of claim 17 wherein the cooling is performed in a static mixer having elements crossing each other and formed as heat exchanging pipes.

19. (New) The method of claim 16 further comprising extruding the mixture after cooling to form strands and chilling formed strands with a coolant.

20. (New) The method of claim 19 wherein the chilling is performed with water.

21. (New) The method of claim 19 further comprising forming the formed strands into granules by disintegration.

22. (New) The method of claim 16 further comprising adding at least one additive to the melt.

23. (New) The method of claim 16 wherein a pressure drop during the dispersing step is larger than a pressure drop during the retaining step.

24. (New) The method of claim 23 further comprising increasing the pressure which the melt is subjected to in-between the dispersing step and the retaining step.

25. (New) The method of claim 16 wherein a pressure drop during the cooling step is larger than a pressure drop during the retaining step.

26. (New) The method of claim 25 further comprising increasing the pressure which the melt is subjected to in-between the retaining step and the cooling step.

27. (New) The method of claim 25 further comprising increasing the pressure which the melt is subjected to in-between the retaining step and the cooling step.

28. (New) The method of claim 16 wherein the dispersing step is performed in a first static mixer and the retaining step is performed in a second static mixer.

29. (New) The method of claim 28 further comprising pumping the mixture into a third static mixer having elements crossing each other and formed as heat exchanging pipes for performing the cooling step.

REMARKS

Upon entry of the foregoing amendments, claims 16-29 are pending.

In the parent application, the Examiner stated that the application was informal in the arrangement of the specification. Accordingly, the specification has been amended to include the headings suggested by the Examiner. Additionally, the disclosure stood objected to for informalities. The specification has been further amended so as not to refer to claim numbers and to correct grammatical errors that occurred during translation of the specification. It is respectfully submitted that no new matter has been added.

In the parent application, the drawings stood objected to under 37 CFR Section 1.83(a). Accordingly, Applicant submits herewith a proposed amended Figure 4. The proposed changes are highlighted. Additionally, the drawings stood objected to as failing to comply with 37 CFR Section 1.84(p)(4) because some of the reference characters in Figure 1 are exactly the same as some of the reference characters in Figure 4, although Figures 1 and 4 are different embodiments. Applicant has changed the reference numerals in Figure 4 that were originally the same as the reference numerals in Figure 1. It is respectfully submitted that no new matter has been added.

The specification has also been amended to reflect the changed reference numerals in Figure 4. Additionally, a statement has been added that the crossing heat exchange element, now illustrated in Figure 4, is exactly the same structure as that of DE 2,839,564. It is respectfully submitted that no new matter has been added.

The claims have been rewritten to place them in better form in accordance with preferred U.S. patent practice and to address concerns raised by the Examiner in the parent application.

Applicant's novel method disperses blowing agent in the melt where the dispersion takes place with extensive shearing. The mixture is retained within a predetermined pressure range for a predetermined retention time where the mixture is subjected to little shearing. During these two steps and the subsequent cooling step, a segregation of the blowing agent is avoided due to static mixing elements that act on the mixture. Accordingly, no extruders are needed, which is advantageous since large quantities of expandable granulates cannot be economically produced with extruders.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

Kevin T. LeMond
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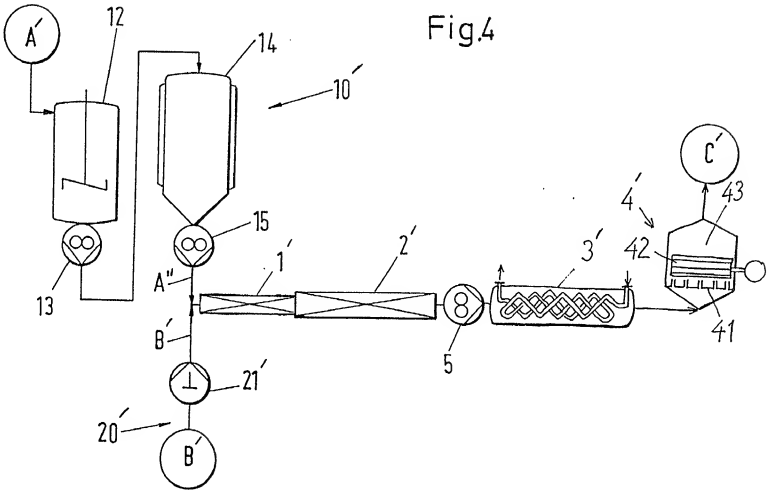
Fig.4



METHOD FOR THE PRODUCTION OF EXPANDABLE PLASTICS GRANULATE

ABSTRACT OF THE DISCLOSURE

Apparatus and method for the production of expandable plastics granulate (C). A plastics melt (A') is impregnated by a fluid blowing agent (B) , which is , at an elevated pressure within a predetermined pressure range, only partly soluble in the melt. The method comprises the following steps: 1. dispersion of the blowing agent in the melt, 2, retaining of the mixture within a predetermined pressure range for a predetermined retention time, 3. cooling of the melt impregnated by the blowing agent to a temperature which is several degrees Celsius above the solidification temperature of the melt, and 4. granulating the cooled mixture. According to the invention the mixture is acted upon by static mixing elements and by this mixing is avoid segregation.

METHOD FOR THE PRODUCTION OF EXPANDABLE PLASTICS GRANULATE

The invention relates to a method for the production of expandable plastics granulate and equipment and plant for carrying out or using the method.

An often used foamed plastics is made of polystyrene. In this process granulate of "expandable polystyrene", EPS, is processed into blocks or moulded parts, while in an intermediate step the granulate is prefoamed. EPS may be manufactured by suspension polymerization. In that process styrene is polymerized in an aqueous phase with the addition of a blowing agent. In this way a bead-shaped granulate is produced within a wide range of bead sizes. A disadvantage of this method is that large quantities of water, which must be cleaned, accumulate and that the granulate is usable for the production of the foamed material only within a limited range of sizes so that a considerable part of the produced polymer must be discarded (or recycled).

In another method, which is little suitable for the production of large quantities of EPS, the polystyrene is, after polymerization, impregnated by a blowing agent in pressure vessels or in extruders. The product is cylindrical granulate.

Further information on foamed materials can be found in Ullmanns Encyklopädie der technischen Chemie (4th edition, 1981), volume 20, pages 415 to 432 and volume 19 pages 268 and 131.

The aim of the invention is to provide a method of economical production of expandable plastics granulate,

for instance of EPS, by which may be produced large quantities without the disadvantages of the known methods. According to this method a plastics melt is impregnated with a fluid blowing agent which is, at elevated pressure within a given pressure region, only partially soluble in the melt. This aim is achieved by the method having characterising features stated in Claim 1. The method may be carried out using equipment according to claim 6 or a plant according to claim 11. A preferred use of such plant (or equipment or method) is in the production of EPS (claim 15).

Large quantities of EPS or another comparable granulate cannot be economically produced by extruders, because a plurality of extruders used in parallel would have to be used. The use of the equipment according to the invention, in which the impregnation of the plastics melt may be carried out in a single apparatus, represents an economical advantage. The teaching of the invention is based substantially on the discovery, that large quantities of expandable plastics granulate may be produced in an apparatus only if provisions against segregation of the melt and blowing agent are possible and are made. According to the invention static mixing elements act during the whole course of the process continuously onto the mixture in such a way that segregation is avoided.

Compared with the known methods using extruders, the method according to the invention has the further advantage that much less energy - about one order less - is needed for the production of expandable plastics granulate. With this advantage is connected a second one, namely that there is a smaller temperature rise during the impregnation and consequently less heat need

be dissipated.

The dependent claims 2 to 4 relate to advantageous embodiments of the method according to the invention. They relate in detail to an efficient method for the impregnation of the plastics melt by the blowing agent, a simple method for the cooling of the impregnated mixture and a useful method of granulation. By the feature of claim 5, namely addition not only of a blowing agent but also several additives to the melt, the quality of the product can be advantageously influenced. As a blowing agent is used a chlorofluorocarbon or preferably a low-boiling hydrocarbon, particularly pentane, or a mixture of such hydrocarbons. As additives may be used flameproofing agents (compounds of bromine), lubricants (oil, derivatives of stearic acid), dyes, antioxidants, softeners or nucleators (for the formation of cells).

The dependent claims 7 to 10 relate to advantageous embodiments of the equipment according to the invention and the dependent claims 12 to 14 relate to various possible applications of the plant according to the invention.

The invention will now be explained in greater detail with reference to the drawings. In the drawings:

Fig. 1 is a block diagram for the explanation of the plant or method according to the invention,

Fig. 2 shows qualitatively represented course of the pressure p for the equipment according to the invention,

Fig. 3 shows the course of pressure in a second

equipment, and

Fig. 4 is a diagram for a plant for the production of EPS according to the invention.

In the block diagram of Fig. 1 the reference numerals 1 to 4 relate to the four method steps referred to in the preamble of claim 1: dispersion 1, retention 2, cooling 3 and granulation 4. To these method steps correspond in the pressure diagrams of Figures 2 and 3 the intervals I, II, III, IV. Because the individual blocks of the diagram in Fig. 1 are interpreted as parts of the plant, the same references may be used for the plant parts in Fig. 4 as in the block diagram. In Fig. 1 are these plant parts 1, 2, 3, and 4 arranged linearly in the direction of the x-axis. The raw materials for the method are a plastics A (or a monomer A) and a blowing agent B (possibly with the addition of one or more additives); the product is the expandable plastics granulate C to be produced.

Fig. 1 shows - interpreted as a plant - the following parts: a source 10 of plastics with a tank 9 for A and a device 11 in which is produced a gas-free plastics melt A'; a source 20 of blowing agent with a tank 19 containing B and a device 21 by means of which B can be metered; a control unit 30 by means of which the amount of B can be adjusted to the amount of A'; and finally the equipment 1, 2, 3, 4, in which is carried out the method according to the invention.

In the dispersion step 1 the melt A' is mixed at elevated pressure with the blowing agent B, the melt being subjected to extensive shearing so that the liquid blowing agent is dispersed in the melt in the form of

fine droplets. During a predetermined retention time in the step 2, the blowing agent partly diffuses in the melt. Impregnation, which is carried out in both the first two steps, proceeds preferably at a temperature which lies considerably above the solidification temperature of the melt. Because the higher the temperature the smaller the viscosity of the melt and the better proceeds the distribution of the blowing agent.

In the cooling step 3 the temperature of the melt impregnated by the blowing agent is reduced several °C above the solidification temperature of the melt. The cooled mixture is then in the last step 4 transformed to granulate form.

To avoid any segregation during the passage through the equipment 1, 2, 3, 4, the mixture is kept in motion in all method steps and also during transfer from one step to the next; this is achieved, according to the invention, by using static mixing elements.

The source 10 of plastics may contain a polymerization reactor for the production of the plastics A' from a monomer raw material A and also a degassifier for the polymer. The source 10 of plastics may also include a recycling device for the recycling of the thermoplastic and a melting device. The thermoplastic should be preferably of the same kind. Also a melting device for a granular thermoplastic may be used as a source of plastics. For instance a heatable extruder may be used as the melting device.

Fig. 2 shows qualitatively the course of pressure p in the four method steps. During the dispersion, interval I, the pressure drop is due to the extensive shearing

relatively large compared with the pressure drop in the second step, interval II. The cooling, interval III, takes place again with a larger pressure drop which is the result of provisions for achieving efficient heat exchange. During the granulation step, interval IV, the mixture is extruded through nozzles while the pressure sharply drops. So as to avoid expansion of the formed strands by the blowing agent, the extruded mixture must be abruptly cooled by a coolant, preferably water.

Between the steps 1 and 2 and/or steps 2 and 3 may be provided pumps by means of which the pressure is again increased. This is shown in Fig. 3, where the intervals I' and II' are associated with such provisions.

In the embodiment shown in Fig. 4 the source 10 of plastics is formed by a polymerization reactor 12 for the production of polystyrene from the monomer raw materia A (styrene), by a degassifier 14 for the polymer and two gear pumps 13 and 15. The blowing agent B (for instance n-pentane) is fed to the melt A' by a metering piston pump 21.

The impregnation is performed in the unit 1, 2 at an initial pressure of e.g. 100 bar (= 10 MPa) and a temperature of about 200 °C. This unit preferably contains a first static mixer, a "shearing mixer" 1 for the dispersion of the blowing agent and a second static mixer, a "retention time mixer" 2, situated immediately next to the first one and serving for diffusive transport of the blowing agent into the melting phase. (The two mixers 1 and 2 are not shown in Fig. 4 as e components.) In the shearing mixer 1 is performed the dispersion with more intensive shearing of the melt while fine droplets of the blowing agent are formed. The intensive shearing

is achieved by a high flow rate. In the retention time mixer 2 the mixture is subjected, during a retention time needed for the diffusive transport, to little shearing. The uneven flowing conditions in the two mixers are obtained in that the second mixer is made with a much larger cross-sectional area than the first one.

A gear pump 5 pumps the impregnated melt into the unit 3 in which is combined mixing by static means with heat exchange. Preferably a device known from DE A 28 39 564 is used, namely: a static mixer whose crossing elements are made as heat exchange pipes. The pressure drop is, for instance, 100 bar and the initial temperature about 120 °C. As a cooler may be used, for instance, a heat exchanger containing a bundle of pipes in whose individual pipes are provided with static mixing elements.

Finally the impregnated and cooled melt is, in a strand granulator 4, which contains a nozzle plate, a cooling bath and a cutting device (not shown), converted into the desired product C, namely EPS. The pressure drop upstream of the nozzle plate is at least 10 bar. As a cooling bath is used a cooling water bath (about 10 °C). The strands emerging from the nozzles (diameter smaller than 1 mm) are first cooled and finally cut by a cutter with several blades. The product is a granulate with granulate grains of uniform size. As a consequence - in contrast to the suspension polymerization mentioned at the beginning - the whole product may be used for the production of foamed plastics.

As a granulation device may be used, apart from the strand granulator, also a hot strand chopping granulator or a so-called underwater granulator. In the underwater

granulator may be made granulate whose grains have practically the same shape as the granulate grains produced by suspension granulation.

CLAIMS

1. Method for the production of expandable plastics granulate from a plastics melt and a fluid blowing agent which is at an elevated pressure within a predetermined pressure range only partly soluble in the melt, the method comprising the following steps:
- dispersion of the blowing agent in the melt,
- retaining of the mixture within a predetermined pressure range for a predetermined retention time,
- cooling of the melt impregnated by the blowing agent to a temperature which is several °C above the solidification temperature of the melt, and
- granulating the cooled mixture,

the method being characterised in that the mixture is acted upon by static mixing elements and by this mixing is avoided segregation.

2. Method according to claim 1, characterised in that the dispersion takes place with extensive shearing of the melt while fine droplets of the blowing agent are formed and that the mixture is then during a predetermined retention time subjected to little shearing.

3. Method according to claim 1 or 2, characterised in that the cooling of the mixture and the simultaneously performed mixing are carried out at least partly by the same components.

4. Method according to any one of claims 1 to 3, characterised in that the cooled mixture is extruded through nozzles and the formed strands are chilled by a coolant, particularly water and by disintegration formed into granules.

5. Method according to any one of claims 1 to 4, characterised in that in addition to the blowing agent at least one additive is added to the plastics melt.

6. Equipment for carrying out the method according to any one of claims 1 to 5, characterised by one or more static mixers (1, 2) for the impregnation of the plastics melt (A') by the fluid blowing agent (B), a cooler (3) for the impregnated melt whose heat exchange elements are in the form of built-in elements of a static mixer, and a granulator (5).

7. Equipment according to claim 6, characterised in that a first static mixer (1) for the dispersion of the blowing agent and a second static mixer (2), which follows directly after the first one and serves for impregnation are provided.

8. Equipment according to claim 6 or 7, characterised in that the cooler (3) is a static mixer whose elements crossing each other are formed as heat exchanging pipes.

9. Equipment according to any one of claims 6 to 8, characterised in that the granulator (4) comprises a nozzle plate, a cooling bath and a cutting device.

10. Equipment according to any one of claims 6 to 9, characterised in that between the mixers (1, 2) for the impregnation of the plastics melt and the cooler (3) is provided a pump (5) for the melt, particularly a gear pump.

11. Plant including an equipment according to any one of claims 6 to 10 which comprises, in addition, the following parts:

- a source (10) of plastics in which may be produced the plastics melt (A'),
- a source (20) of blowing agent by means of which may be carried a metered supply of the blowing agent (B), and
- a control unit (30) for controlled supply of the blowing agent adjusted according to the flow of melt.

12. Plant according to claim 11, characterised in that the source (10) of plastics comprises a polymerization reactor (12) for the production of the plastics from a monomer raw material (A) and a degassifier (14) for the polymer (A').

13. Plant according to claim 11, characterised in that the source (10) of plastics comprises a recycling device for the recycling of a thermoplastics, particularly thermoplastics of the same kind, and a melting device, particularly a heated extruder.

14. Plant according to claim 11, characterised in that the source (10) of plastics is a melting device, particulary a heated extruder for a granulate thermoplastic.

15. Use of a plant according to claim 11 for the production of "expandable polystyrene", EPS, from newly produced or recycled polystyrene, while preferably a low-boiling hydrocarbon, particularly pentane, or a mixture of such hydrocarbons, is used as the blowing agent (B).

ABSTRACT

In a method for the production of expandable plastics granulate (C) a plastics melt (A') is impregnated by a fluid blowing agent (B), the blowing agent being at an elevated pressure within a predetermined pressure range only partly soluble in the melt. The method comprises the following steps: 1. dispersion of the blowing agent in the melt, 2. retaining of the mixture within a predetermined pressure range for a predetermined retention time, 3. cooling of the melt impregnated by the blowing agent to a temperature which is several °C above the solidification temperature of the melt, and 4. granulating the cooled mixture. According to the invention the mixture is acted upon by static mixing elements and by this mixing is avoided segregation.

(Fig. 1)

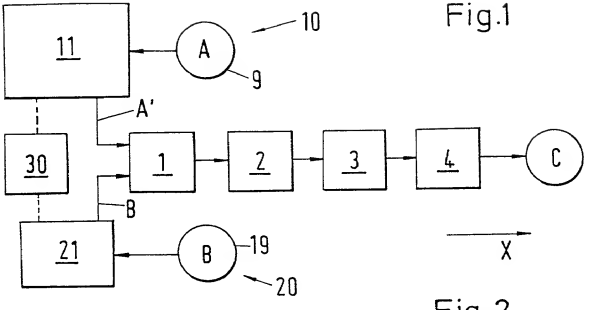


Fig.1

Fig.2

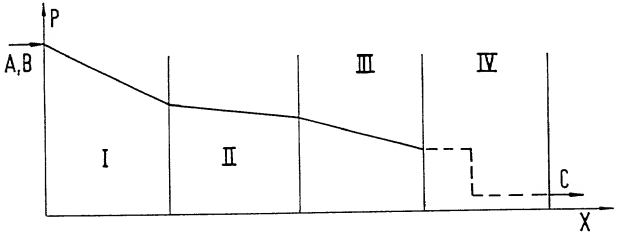


Fig.3

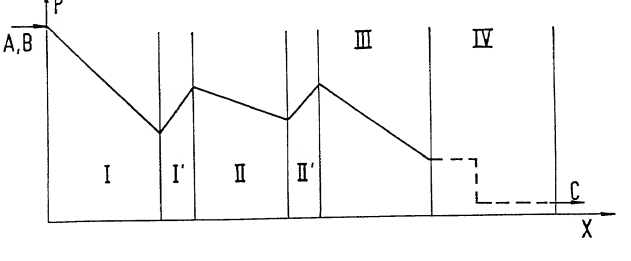
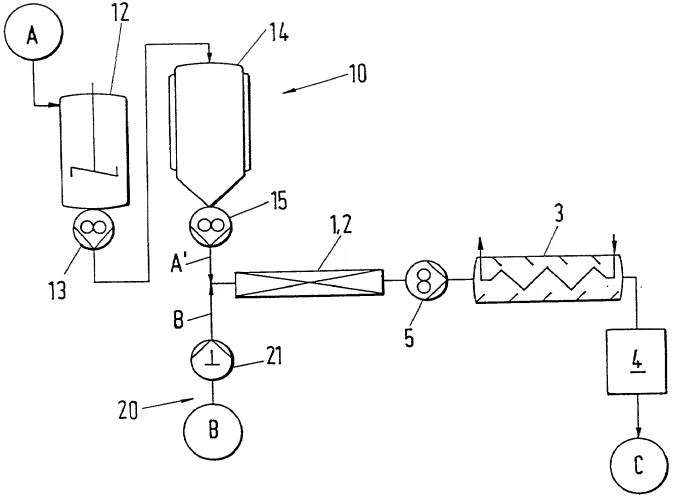


Fig.4



ATTORNEY DOCKET NO.

DECLARATION AND POWER OF ATTORNEY

P.6623 US

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

Method for the production of expandable plastics granulate

the specification of which ☒ is attached hereto or ☐ was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable).

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

COUNTRY	APPLICATION NUMBER	DATE OF FILING	PRIORITY CLAIMED UNDER 35 U.S.C. 119
Europe	94810098.7	February 21, 1994	Yes X No ____
			Yes ____ No ____

I claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NO.	DATE OF FILING	STATUS
		☐ Patented ☐ Pending ☐ Abandoned
		☐ Patented ☐ Pending ☐ Abandoned

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) who are partners and associates in the firm of Townsend and Townsend to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of Inventor 201	Signature of Inventor 202	Signature of Inventor 203
Andreas Walder		
Date: Jan 5th, 1995	Date	Date